

Patent Claims

1. Process for the preparation of organic salts containing bis(perfluoroalkyl)-
 5 phosphinate anions comprising at least the reaction of a tris(perfluoroalkyl)-
 phosphine oxide with an alcohol and an organic base which is more strongly
 basic than the alcohol.

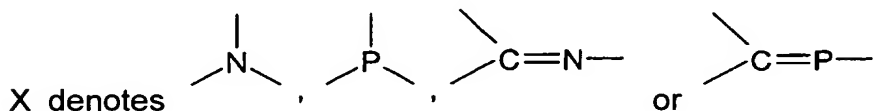
2. Process for the preparation of organic salts containing bis(perfluoroalkyl)-
 10 phosphinate anions according to Claim 1,
 characterised in that the organic base employed is a compound of
 the general formula (1)



or of the general formula (2)



in which



20 Y denotes -O-, -S-, -Se-, -C(=O)-, -C(=S)- or -C(=Se)-,

R denotes -H for Y ≠ O and where, in the case of the formula (2), all R
 cannot simultaneously be H,
 straight-chain or branched alkyl having 1-20 C atoms,
 25 straight-chain or branched alkenyl having 2-20 C atoms and
 one or more double bonds,
 straight-chain or branched alkynyl having 2-20 C atoms and
 one or more triple bonds or
 saturated, partially or fully unsaturated cycloalkyl
 30 having 3-7 C atoms, in particular phenyl,
 which may be substituted by alkyl groups having 1-6 C atoms,

where the substituents R are in each case identical or different,

5 where the substituents R may be bonded to one another in pairs by a single or double bond,

where one or more, but not all, the substituents R may be partially or fully substituted by halogens, in particular -F and/or -Cl, or partially by -CN or -NO₂,

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and where one or two non-adjacent carbon atoms of the substituent R may be replaced by atoms and/or atom groups selected from the group -O-, -C(O)-, -C(O)O-, -C(O)NH-, -C(O)NR'-, -S-, -S(O)-, -S(O)NH-, -S(O)NR'-, -S(O)O-, -S(O)₂-, -S(O)₂O-, -S(O)₂NH-, -S(O)₂NR'-, -N=, -N=N-, -NH-, -NR'-, 15 -PH-, -PR'-, -P(O)R'-, -P(O)R'-O-, -O-P(O)R'-O- and -PR'₂=N- where R' = non-, partially or perfluorinated C₁- to C₆-alkyl, C₃- to C₇-cycloalkyl, unsubstituted or substituted phenyl or an unsubstituted or substituted heterocycle.

20 3. Process according to Claim 1 or 2,

characterised in that the organic base employed is a compound selected from the group (C₂H₅)₃N, (C₂H₅)₂NH, (C₂H₅)₃P, (C₂H₅O)₃P, (C₄H₉)₃P, CH₃-S-CH₃, (CH₃)₂N-C(O)-N(CH₃)₂, C₆H₅-Se-C₆H₅, guanidine, pyridine, imidazole, N-methylimidazole, benzoxazole, benzothiazole, 25 pyrrolidine, piperidine, piperazine, aniline, N,N-dimethylaniline, benzylamine, N-ethylbenzylamine or diphenyl sulfide.

4. Process for the preparation of organic salts containing bis(perfluoroalkyl)-phosphinate anions according to one or more of Claims 1 to 3, 30 characterised in that the alcohol employed is an aliphatic alcohol.

5. Process according to one or more of Claims 1 to 4,
characterised in that the alcohol employed is a compound
selected from the group methanol, ethanol, isopropanol, n-propanol, butanol,
hexanol and benzyl alcohol.
- 5 6. Process according to one or more of Claims 1 to 4,
characterised in that the alcohol employed is a fluorinated aliphatic
alcohol.
- 10 7. Process according to one or more of Claims 1 to 4,
characterised in that the alcohol employed is an unsaturated
alcohol.
- 15 8. Process for the preparation of organic salts containing bis(perfluoroalkyl)-
phosphinate anions according to one or more of Claims 1 to 7,
characterised in that the tris(perfluoroalkyl)phosphine oxide em-
ployed is a tris(perfluoroalkyl)phosphine oxide in which the three perfluoro-
alkyl groups are identical or different.
- 20 9. Process for the preparation of organic salts containing bis(perfluoroalkyl)-
phosphinate anions according to one or more of Claims 1 to 8,
characterised in that the tris(perfluoroalkyl)phosphine oxide
employed is a tris(perfluoroalkyl)phosphine oxide in which the perfluoroalkyl
groups contain 1 to 12 C atoms and are straight-chain or branched.
- 25 10. Process according to Claim 8 or 9,
characterised in that the tris(perfluoroalkyl)phosphine oxide
employed is a compound selected from the group $(\text{CF}_3)_3\text{P}(\text{O})$, $(\text{C}_2\text{F}_5)_3\text{P}(\text{O})$,
 $(\text{C}_3\text{F}_7)_3\text{P}(\text{O})$ or $(\text{C}_4\text{F}_9)_3\text{P}(\text{O})$.
- 30 11. Process for the preparation of organic salts containing bis(perfluoroalkyl)-
phosphinate anions according to one or more of Claims 1 to 10,

characterised in that the reaction is carried out at a temperature of -20°C to 200°C.

- 5 12. Use of the organic salt containing a bis(perfluoroalkyl)phosphinate anion prepared according to one or more of Claims 1 to 11 as ionic liquid.
- 10 13. Use of the organic salt containing a bis(perfluoroalkyl)phosphinate anion prepared according to one or more of Claims 1 to 11 as phase-transfer catalyst or as surfactant.
- 15 14. Use of the organic salt containing a bis(perfluoroalkyl)phosphinate anion prepared according to one or more of Claims 1 to 11 as conductive salt in electrochemical cells.
- 20 15. Use of the organic salt containing a bis(perfluoroalkyl)phosphinate anion prepared according to one or more of Claims 1 to 11 as plasticiser.
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